

CLAIMS

1. (original) An identification tag (100) for use in a system (400) for determining the position of the identification tag (100), which may be in motion in a room in a building or other areas to be monitored,
characterised in that the identification tag (100) comprises an ultrasonic transducer (190) connected to a transmitter (180) adapted to transmit ultrasonic signals, together with a radio transmitter (170) and radio receiver (175) connected to an antenna (195) for transmitting and receiving radio signals containing the identity of the identification tag (100).
2. (original) An identification tag (100) according to claim 1,
characterised in that it comprises a control unit (160) adapted to control the transmission of ultrasonic signals and radio signals.
3. (currently amended) An identification tag (100) according to claims 1 ~~and or~~ 2,
characterised in that the radio receiver (175) is connected to the control unit (160) and arranged to receive radio messages from other identification tags (100).
4. (currently amended) An identification tag (100) according to claims 1 ~~and or~~ 2,
characterised in that the radio receiver (175) is connected to the control unit (160) and arranged to receive radio messages from stationary master units (200).
5. (currently amended) An identification tag (100) according to claim 1,
characterised in that the radio transmitter (170) is connected to the control unit (160) and adapted to transmit radio messages to stationary master units (200).
6. (currently amended) An identification tag (100) according to claims 1 ~~and or~~ 2,
characterised in that it further comprises a sabotage unit (110) connected with the control unit (160) for detecting any attempt to remove and/or open the identification tag (100), and where, after such detection, the control unit (160) is adapted to add such additional information to the radio signal transmitted from the identification tag (100).
7. (original) A stationary master unit (200), specially adapted to a system (400) for position determination of objects which may be in motion,
characterised in that it comprises:
 - an ultrasonic transducer (265) for receiving ultrasonic signals in the form of ultrasonic pulses, together with a radio transmitter unit (275) and a radio receiver unit (270) connected to an antenna (295) for transmitting and receiving information from an identification tag (100) according to claims 1-6,
 - a receiver unit (260) for detecting ultrasonic pulses transmitted from the identification

tag (100),

- signal processing means (230) for receiving and interpreting radio signals, and for executing the following steps for processing the received ultrasonic pulses:
 - calculating transit time differences for received ultrasonic pulses transmitted from the identification tag (100),
 - transmitting to a central processing unit (410) via a network (215) data containing transit time differences for received ultrasonic pulses, an identification of the room in which it is located, and the identification of the identification tag (100).

8. (currently amended) A system (400) for determining the position of at least one identification tag (100),

characterised in that it comprises:

- at least one identification tag (100) according to claims 1-6,
- one or more stationary master units (200) according to claim 7 for detecting transit time differences for the ultrasonic pulses transmitted from the identification tag (100),
- one or more stationary slave units (300) with means for receiving ultrasonic signals in the form of ultrasonic pulses, means for detecting ultrasonic pulses transmitted from the identification tag (100), means for measuring transit time differences for received ultrasonic pulses, together with means for transmitting this information to stationary master units (200),
- a network (215) interconnecting several stationary slave units (300) and stationary master units (200),
- at least one central processing unit (410) for collecting, interpreting and processing data transmitted from stationary master units (200),
- a network (215) interconnecting several stationary master units (200) with the central processing unit (410), and
- processing means in the central processing unit (410) for determining the position of a transmitter unit (100).

9. (currently amended) A system according to claim 8, characterised in that the network connection (215) interconnecting stationary slave units (300) and stationary master units (200) is radio-based.

10. (currently amended) A system according to claim 8, characterised in that the network connection (215) interconnecting stationary slave units (300) and stationary master units (200) is wire-based.

11. (currently amended) A system according to claim 8, characterised in that the connection between stationary master units (200) and the central processing unit (410) is based on radio waves.

12. (currently amended) A system according to claim 8, characterised in that the connection between stationary master units (200) and the central processing unit (410) is wire-based.
13. (currently amended) A method for determining the position of one or more objects which may be in motion in a room in a building or other areas, characterised in that the method comprises:
 - a) employing an identification tag (100) according to claims 1-6 to listen for radio messages,
 - b) transmitting a radio message from the identification tag (100) with a request for permission to transmit ultrasonic pulses,
 - c) receiving a radio message from other identification tags (100) if they are simultaneously executing transmission of ultrasonic signals,
 - d) transmitting an ultrasonic pulse from the identification tag (100) while it simultaneously transmits a radio signal, if it has not received a radio message telling that other identification tags (100) are transmitting,
 - e) receiving the ultrasonic pulse from the identification tag (100) on one or more stationary master units (200) and stationary slave units (300), while stationary master units (200) are also simultaneously receiving a radio signal from the identification tag (100),
 - f) receiving the radio signal from the identification tag (100) on a stationary master unit (200),
 - g) calculating transit time differences for received ultrasonic pulse on stationary master units (200) and stationary slave units (300),
 - h) transmitting information on transit time differences from stationary slave units (300) to stationary master units (200),
 - i) transmitting information on transit time differences, identification of room and radio signal information received in stationary master units (200) from stationary slave units (300) and identification tag (100) to a central processing unit (410),
 - j) calculating the position of the identification tag (100) which transmitted the ultrasonic pulse on the basis of the identification of the identification tag (100) and transit time differences of transmitted ultrasonic pulse from the identification tag (100), together with knowledge of the position of each individual stationary master unit (200) and stationary slave unit (300) in each room or area.
14. (original) A method according to claim 13, characterised in that the radio message to which the identification tag (100) listens contains information concerning which ultrasonic frequency or coding is employed by other identification tags (100) which are currently transmitting ultrasonic pulses.

15. (original) A method according to claim 13, characterised in that the request in the form of a radio message from the identification tag (100) is transmitted when the identification tag (100) is set in motion.
16. (original) A method according to claim 13, characterised in that the request in the form of a radio message from the identification tag (100) is transmitted after a preset period.
17. (original) A method according to claim 13, characterised in that the request in the form of a radio message from the identification tag (100) is transmitted when parts of the identification tag (100) are exposed to light.
18. (currently amended) A method according to claims 13 ~~and or~~ 14, characterised in that the frequency or coding of the ultrasonic pulse employed by the identification tag (100) is different to that currently employed by other identification tags (100).
19. (original) A method according to claim 13, characterised in that the radio signal transmitted from the identification tag (100) while it simultaneously transmits an ultrasonic pulse contains the identification number and ultrasonic frequency or coding employed by the identification tag (100).
20. (original) A method according to claim 19, characterised in that the radio signal transmitted from the identification tag (100) may further contain additional information, such as that an attempt has been made to remove the tag.